

### ***Remarks***

Reconsideration of this Application is respectfully requested.

Upon entry of the foregoing amendment, claims 1-30 are pending in the application, with claims 1, 6, 13, 20 and 28 being the independent claims. Claims 20-30 have been amended.

Claims 20-26 and 28-30 stand rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter. Claims 1 and 5-30 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,393,163<sup>1</sup> to Burt *et al.* (hereinafter "Burt"). Claims 2-4 have been indicated as allowable if rewritten in independent form, including all of the limitations of the base claim and any intervening claims.

Based on the above Amendment and the following Remarks, Applicants respectfully request that the Examiner reconsider all outstanding objections and rejections and they be withdrawn.

#### **I. Claims 20-26 and 28-30 Are Directed to Statutory Subject Matter**

Claims 20-26 and 28-30 stand rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter. Applicants have amended claims 20-30 where appropriate to address the Examiner's rejection and comments. Accordingly, Applicants respectfully request that the Examiner withdraw the rejection of claims 20-26 and 28-30 under 35 U.S.C. § 101.

#### **II. Claims 1 and 5-30 are Patentable Over Burt**

Claims 1 and 5-30 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Burt. For the following reasons, this rejection is respectfully traversed.

Claim 1 recites the steps of "computing a numerical approximation to at least one of the slope, curvature, and/or another predetermined geometric feature, and storing the numerical approximation together with data values prescribed at certain predetermined locations [and] applying a suitable compression technique to the geometric feature." Claim 6 recites a system including "a gradient module configured to receive [] surface data and generate a gradient signal

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<sup>1</sup> The Office Action, at ¶ 4, indicates the patent number of the Burt, *et al.* reference to be 4,906,940. However, Applicants believe that the correct patent number is 6,393,163.

[and] a compression module configured to receive the gradient signal and generate a compressed signal.” Claim 13 recites a system including “a first gradient module configured to receive [] surface data and generate a first gradient signal; a second gradient module configured to receive the surface data and generate a second gradient signal [and] a compression module configured to receive the second gradient signal and generate a compressed signal.” Claim 20 recites the steps of “generating a gradient of a signal [and] compressing the gradient of the signal to generate a compressed signal.” Claim 28 recites the steps of “generating a first gradient of [a] signal; generating a second gradient from the first gradient [and] compressing the second gradient to generate a compressed signal.”

The present invention is a system for providing accurate compression, storage, transmission and reconstruction of data representing terrain and other physical signals or surfaces in one or multiple dimensions. Burt, on the other hand, discloses a system for generating a single mosaic image or images from a single image or a plurality of images. *See* col.3, ll.48-57. The system disclosed by Burt generates a seamless mosaic by aligning the images based on common features (*see* col.4, ll.6-9 and col.6, ll.1-10) and then removes redundancy in the images to compress the amount of memory occupied by the mosaic. *See* col.14, ll.37-39 and col.15, ll.20-28. The Burt system has nothing to do with the compression, storage, transmission and reconstruction of data representing terrain or other physical signals or surfaces.

**A. Claims 1 and 5 are Patentable Over Burt**

Burt does not disclose or even merely suggest the steps of “computing a numerical approximation to at least one of the slope, curvature, and/or another predetermined geometric feature, and storing the numerical approximation together with data values prescribed at certain predetermined locations [and] applying a suitable compression technique to the geometric feature,” as recited in claim 1.

The Office Action alleges that Burt “describes computing a numerical approximation to at least one of the slope, curvature, and/or another predetermined geometric feature” at column 8, lines 2-52. *See* Office Action, ¶ 4. However, the cited section of Burt discloses taking the Laplacian image pyramid of an image (*see* col.6, ll.39-46) which, as discussed below, does not

include the computation of a numerical approximation of any geometric feature of an image. Furthermore, there is no mention at any other point in the Burt disclosure of the computation of a numerical approximation of any geometric feature of any image.

Creating the Laplacian image pyramid of an image does not include the computation of a numerical approximation of any geometric feature in the original image. Rather, it consists of creating several low-resolution images of each layer of the original image. *See* col.6, ll.39-46. The Examiner may be confusing the creation of a Laplacian image pyramid of an image with the computation of the Laplacian of an image. However, the two are not the same. The former involves the creation of a multiresolution decomposition of an image while the latter involves computing the second derivative of the image. As such, no numerical approximations of any features of the original image are made in the creation of a Laplacian image pyramid of an image, as disclosed by Burt.

Further, the Office Action alleges that Burt discloses “applying a suitable compression technique to the geometric feature” at column 15, lines 1-28. *See* Office Action, ¶ 4. However, as discussed above, Burt does not disclose the numerical computation of any geometric feature in any way. Therefore, it follows that Burt also does not disclose the compression of any geometric feature. The section of Burt cited by the Examiner merely discloses the removal of residual features common to all images in the mosaic so as to compress the entire resultant image and does not mention the compression of a geometric feature.

Because Burt fails to disclose, teach or suggest the claimed apparatus including the steps of “computing a numerical approximation to at least one of the slope, curvature, and/or another predetermined geometric feature, and storing the numerical approximation together with data values prescribed at certain predetermined locations [and] applying a suitable compression technique to the geometric feature,” claim 1 is allowable over Burt. Claim 5 depends from claim 1 and is also allowable for at least these reasons. Therefore, Applicants respectfully request that the Examiner withdraw the rejection of claims 1 and 5.

**B. Claims 6-30 are Patentable Over Burt**

Burt does not disclose or even merely suggest a system including “a gradient module configured to receive [] surface data and generate a gradient signal [and] a compression module configured to receive the gradient signal and generate a compressed signal,” as recited in claim 6, a system including “a first gradient module configured to receive [] surface data and generate a first gradient signal; a second gradient module configured to receive the surface data and generate a second gradient signal [and] a compression module configured to receive the second gradient signal and generate a compressed signal,” as recited in claim 13, a method including the steps of “generating a gradient of a signal [and] compressing the gradient of the signal to generate a compressed signal,” as recited in claim 20, or a method including the steps of “generating a first gradient of [a] signal; generating a second gradient from the first gradient [and] compressing the second gradient to generate a compressed signal,” as recited in claim 28.

With regard to claims 6 and 20, the Office Action alleges that “Burt describes a gradient module [elements 806 and 808] configured to receive the surface data and generate a gradient signal [and] a compression module [802] configured to receive the gradient signal and generate a compressed signal.” *See* Office Action, ¶ 4. With regard to claims 13 and 28, the Office Action alleges that “Burt describes a first gradient module [element 806] configured to receive the surface data and generate a first gradient signal, a second gradient module [element 808] configured to receive the surface data and generate a second gradient signal [and] a compression module [802] configured to receive the second gradient signal and generate a compressed signal.” *See* Office Action, ¶ 4. However, Burt does not describe, at any point in the disclosure, taking the gradient of a signal and compressing that gradient signal, as recited in claims 6, 13, 20 and 28.

Elements 806 and 808 (*see* FIG.8) do not generate the gradient of a received signal as the Examiner alleges. Element 806 is a “residual analyzer” used for “conventionally comparing . . . an image from the mosaic to a corresponding input image.” *See* col.15, ll.51-53. The residual operates by removing common features in multiple images so as to avoid coding redundant information when the mosaic image is stored. *See* col.15, ll.51-60. This comparison does not involve, in any way, taking the gradient of the mosaic image.

Element 808 is a “significance analyzer” which “selects which of the residuals [output by the residual analyzer] should be coded for storage and which are not necessary for accurately recreating the mosaic upon retrieval.” *See* col.16, ll.6-10. To determine what residuals are to be stored, the significance analyzer must approximate the amount of motion of each residual compared to the rest of the mosaic image. *See* col.16, ll.11-16. To accomplish this approximation, a “flow estimate” is calculated which is the amount of movement of the residual from one frame to the next frame in the mosaic. *See* col.16, ll.17-20. The “flow estimate” is calculated by taking the spatial intensity gradient at each pixel in corresponding frames. *See* col.16, ll.27-39. Based on the “flow estimate,” the significance analyzer makes a determination as to what residuals identified by the residual analyzer are to be stored.

While the “significance analyzer” does calculate a gradient, it does not generate a gradient signal of an image to be stored as a compressed signal, as recited by claims 6, 13, 20 and 28. Rather, the gradient calculation is used to obtain a “flow estimate” which is then used to make a determination as to what *residuals* are to be stored as a part of the mosaic. The spatial intensity gradient is not compressed and/or stored along with these residuals. Therefore, upon decompression and retrieval of the stored mosaic (including the stored residuals), the gradient signal is not recovered.

Because Burt fails to disclose, teach or suggest a system including “a gradient module configured to receive [] surface data and generate a gradient signal [and] a compression module configured to receive the gradient signal and generate a compressed signal,” a system including “a first gradient module configured to receive [] surface data and generate a first gradient signal; a second gradient module configured to receive the surface data and generate a second gradient signal [and] a compression module configured to receive the second gradient signal and generate a compressed signal,” a method including the steps of “generating a gradient of a signal [and] compressing the gradient of the signal to generate a compressed signal,” or a method including the steps of “generating a first gradient of [a] signal; generating a second gradient from the first gradient [and] compressing the second gradient to generate a compressed signal,” claims 6, 13, 20 and 28 are allowable over Burt. Claims 7-12, 14-19, 21-27 and 29-30 depend from one of

claims 6,13, 20 or 28 and are also allowable for at least these reasons. Therefore, Applicants respectfully request that the Examiner withdraw the rejection of claims 6-30.

### ***Conclusion***

All of the stated grounds of objection and rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully requests that the Examiner reconsider all presently outstanding objections and rejections and that they be withdrawn. Applicants believe that a full and complete response has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Amendment is respectfully requested.

Respectfully submitted,

  
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